



# POL Products Guide

For Ground Vehicle and Equipment  
Materiel Systems

July 2010

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## **POL PRODUCTS GUIDE**

This Petroleum, Oil and Lubricants (POL) Products Guide is designed as a quick reference to assist materiel and combat developers, supply and maintenance personnel, and other field users in properly using petroleum and its related product commodities that are common to the military supply system. The guidance being provided covers essentially fuels, fuel additives, lubricants, and associated products (e.g., hydraulic fluids, antifreeze, etc.) that are required and used in Army (and DOD) ground vehicles, equipment, and materiel. It also includes referee fuels and reference oils.

Individual product guides sheets have been developed and formatted to provide the maximum amount of information needed for using these POL Products. Each guide sheet covers a generic product type and includes such information as the relevant military/federal specification, military symbol and NATO Code Number, available container size and National Stock Number (NSN), product applications, temperature range limitation, and general comments relative to product usage.

This POL Products Guide is not intended to replace any military/ federal specification or the vehicle/equipment LUBE Order (LO), but merely to provide a quick reference source. This document will be updated periodically to accommodate changes in specifications, NSNs, etc.

As an example, this Guide will generate the following types of information on a typical product such as OE/HDO-15/40.

- OE/HDO-15/40 is the military symbol for the SAE 15W-40 Grade under MIL-PRF-2104. (Lubricating Oil, Internal Combustion Engine, Combat/Tactical Service).
- OE/HDO-15/40 is interchanged within NATO under Code Number O-1236. It is packaged in three (3) different size containers each having separate National Stock Numbers (NSN).
- OE/HDO-15/40 is one of four (4) different grades under MIL-PRF-2104. This oil is used in engines, hydraulic systems, transmissions, power steering units, and can be used in gear box units. However, one should consult the vehicle/equipment Lube Order (LO) if there is a question.
- OE/HDO-15/40, when used in either engines or transmissions, is acceptable for use in ambient temperatures ranging from approximately 0°F to 120°F.

The regulations governing responsibility for development and updating documents of this nature are listed as follows:

- Army Regulation 70-12, Fuels and Lubricants Standardization Policy for Equipment Design, Operation, and Logistic Support, 1 May 1997.
- Army Regulation 715-13, Engineering Support for Items Supported by Defense Logistics Agency, 13 March 1986.
- AMC Regulation 750-11, Use of Lubricants, Fluids, and Associated Products, 15 June 1986.

Questions relative to this document and its use should be directed to the following:

U.S. Army RDECOM-TARDEC  
6501 E. 11 Mile Road  
ATTN: Fuels and Lubricants Technology Team  
RDTA-DP (MS-110)  
Warren, MI 48397-5000

**Facsimile:**

Commercial (586) 282-4244  
DSN 786-4244

**Email:** POLhelp@us.army.mil

Any recommended change or additions to improve the overall utility of this POL Products Guide are welcome and will be appreciated.

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COMBAT/TACTICAL ENGINE OILS					
MIL-PRF-2104 - Lubricating Oil, Internal Combustion Engine, Tactical Service					
MIL-PRF-46167 - Lubricating Oil, Internal Combustion Engine, Arctic					
Military Specification	Military Symbol (SAE Grade)	NATO Code	Size Container	NSN 9150-	Application (All Products)
MIL-PRF-2104	OE/HDO-15/40 (SAE 15W-40)	O-1236	1-Qt	01-178-4725	★ Engine Systems ★ Hydraulic Systems ★ Transmission Systems ★ Power Steering Units ★ Non-hypoid Gear Box Systems
			1-Qt (metal)	01-421-1427	
			5-Gal	01-152-4117	
			55-Gal	01-422-9346	
				01-152-4118	
				01-421-1424	
				01-152-4119	
				01-421-1432	
	OE/HDO-10 (SAE 10W)	O-237	1-Qt	01-177-3988	
			1-Qt (metal)	01-496-1957	
			5-Gal	00-189-6727	
			55-Gal	00-186-6668	
				01-496-1946	
				00-191-2772	
				01-496-1939	
	OE/HDO-30 (SAE 30)	O-238	1-Qt	01-178-4726	
			1-Qt(metal)	01-433-7974	
			5-Gal	01-186-6681	
			55-Gal	01-433-7988	
				00-188-9858	
				01-433-7986	
				00-189-6729	
				01-433-7978	
	OE/HDO-40 (SAE 40)	NONE	55-Gal	00-188-9862	
				01-433-7970	
				01-460-7956	
MIL-PRF-46167	OEA-30 (SAE 0W-30)	O-183	1-Qt	00-402-4478	
			5-Gal	00-402-2372	
			55-Gal	00-491-7197	

Comments: The temperature ranges recommended for usage of the various grade oils conform to systems. However, requirements for some equipment may vary from these recommendations and should be used. These engine oils can tolerate engine oil sump temps of 250°F as standard up to 300°F temps in the trans oil sump. The NSNs identified with a - ♦ - are for lubricants manufactured aboard ships. OE/HDO-15/40 and OE/HDO-10W are fully compatible with MIL MIL requirements. See page 15 for more information on tactical and combat hydraulic fluids. Please contact POI

Comments: The temperature ranges recommended for usage of the various grade oils conform with requirements established by the Lube orders (LO's) for the majority of the combat and tactical ground systems. However, requirements for some equipment may vary from these recommendations and individual equipment LO's must be consulted if there is a question as to the proper grade of lubricant which should be used. These engine oils can tolerate engine oil sump temps of 250°F as standard operation with spikes up to 275°F for short durations. However, for transmission operations the oils can withstand 300°F temps in the trans oil sump. The NSNs identified with a - ♦ - are for lubricants manufactured with a minimum of 25% re-refined basestock. The metal cans are only for Navy use due to their stacking requirements aboard ships. OE/HDO-15/40 and OE/HDO-10W are fully compatible with MIL-PRF-46170 (FRH) and MIL-PRF-6083 (OHT) and may be used as hydraulic fluids in some hydraulic systems. See page 15 for more information on tactical and combat hydraulic fluids. Please contact POLHelp prior to changing the hydraulic fluid in a vehicle system.

# TURBINE ENGINE OILS

## DESCRIPTION

These oils are used as the engine lubricant for the Abrams series tank and other systems equipped with turbine engines. These oils are not for use in any ground engine systems powered by diesel or gasoline engines.

### Ambient Temperature Range Usage

FOR TURBINE ENGINE

EXPECTED TEMPERATURES

°F	<-50	-40	-30	-20	-10	0	10	20	30	40	50	60	70	80	90	100	110	120
°C	<-46	-40	-34	-29	-23	-18	-12	-7	-1	4	10	16	21	27	32	38	44	49
MIL-PRF-7808 (O-163) Grade 4																		
MIL-PRF-23699 (O-156)																		
MIL-PRF-7808 (O-148) Grade 3																		

**Comments:** The temperature ranges recommended for usage of the turbine engine oils conform with requirements established by the Lube Orders (LO) for the M1/M1A1 series tank. Requirements for other ground equipment may vary from these recommendations. LO's must be consulted if there is a question as to the proper lubricant which should be used. Prolonged skin contact with either oil should be avoided since it may cause skin rash. Areas using these oils with other gasoline or diesel engine oils since damage to internal components will occur.

**THESE RECOMMENDATIONS DO NOT APPLY TO AIRCRAFT.**





PRESERVATIVE OILS						UNCLASSIFIED	DESCRIPTION
MIL-PRF-32033 - Lubricating Oil, General Purpose, Preservative (Water-Displacing, Low Temperature)						<b>MIL-PRF-32033</b> is a water-displacing, preservative lubricating oil for general purpose lubrication and protection against corrosion of certain small arms and whenever a general purpose, low temperature lubricating oil is required. MIL-PRF-32033 can be applied by dipping, brushing or spraying from gas-pressurized cans.	
MIL-PRF-3150 - Lubricating Oil, Preservative, Medium							
MIL-PRF-46002 - Preservative Oil, Contact and Volatile Corrosion-Inhibited							
Military Specification	Military Symbol	NATO Code	Size Container	NSN 9150-	Application	<b>None of these preservative oils are to be used for the preservation of fuel tanks or engines.</b>	
MIL-PRF-32033	PL-S	O-190	1/2-Oz 1-Oz 4-Oz 16-Oz 16-Oz 1-Qt 1-Gal 5-Gal 55-Gal	00-836-8641 00-261-8146 00-273-2389 00-458-0075 01-374-2021 00-231-6689 00-231-9045 00-231-9062 00-281-2060	(Aerosol) (Sprayer)  ★ Preservation of Lubrication of Materiel		
MIL-PRF-3150	PL-M	O-192	4-Oz 1-Qt 5-Gal 55-Gal	00-271-8427 00-231-2361 00-231-2356 00-231-2357			
MIL-PRF-46002	NONE	NONE	1-Qt 5-Gal 55-Gal	00-889-3523 00-985-7293 00-407-0973	★ Preservation of non-wetted Surfaces		
<div>Comments:</div> <b>MIL-PRF-32033</b> is a light preservative oil which is also water-displacing. It has been found to wash away with water, so must be reapplied. <b>MIL-PRF-3150</b> is a medium weight preservative oil with much more stringent corrosion inhibiting requirements, so may be a superior preservative oil for many applications which can tolerate a more viscous oil.							

GEAR LUBRICANTS						UNCLASSIFIED	DESCRIPTION																																																																																																																	
SAE J2360 - Lubricating Oil, Gear, Multipurpose (previously MIL-PRF-2105)						These gear lubricants are for use in differentials and manual transmissions, heavy duty industrial type enclosed gear units, steering gears, and fluid lubricated universal joints of automotive ground equipment. These lubricants are not intended for use in automatic transmission or power steering systems. The oils under SAE J2360 meet the API GL-5 and MT-1 (class 7/8 manual transmission) performance criteria.																																																																																																																		
Military Specification	Military Symbol (SAE Grade)	NATO Code	Size Container	NSN 9150-	Application (All Products)	Ambient Temperature Range Usage (See Comments)																																																																																																																		
SAE J2360	G0-75 (SAE 75W-90)	O-186	1-Qt 1-Gal 5-Gal	01-035-5390 01-048-4593 01-035-5391	★ Axles ★ Differentials	<table><tr><th colspan="19">EXPECTED TEMPERATURES</th></tr><tr><th>°F</th><td>&lt;-50</td><td>-40</td><td>-30</td><td>-20</td><td>-10</td><td>0</td><td>10</td><td>20</td><td>30</td><td>40</td><td>50</td><td>60</td><td>70</td><td>80</td><td>90</td><td>100</td><td>110</td><td>120</td></tr><tr><th>°C</th><td>&lt;-46</td><td>-40</td><td>-34</td><td>-29</td><td>-23</td><td>-18</td><td>-12</td><td>-7</td><td>-1</td><td>4</td><td>10</td><td>16</td><td>21</td><td>27</td><td>32</td><td>38</td><td>44</td><td>49</td></tr><tr><td colspan="19">GO-85/140 (O-228)</td></tr><tr><td colspan="19">GO-80/90 (O-226)</td></tr><tr><td colspan="19">GO-75 (O-186)</td></tr></table>	EXPECTED TEMPERATURES																			°F	<-50	-40	-30	-20	-10	0	10	20	30	40	50	60	70	80	90	100	110	120	°C	<-46	-40	-34	-29	-23	-18	-12	-7	-1	4	10	16	21	27	32	38	44	49	GO-85/140 (O-228)																			GO-80/90 (O-226)																			GO-75 (O-186)																		
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GO-75 (O-186)																																																																																																																								
	GO-80/90 (SAE 80W-90)	O-226	1-Qt 5-Gal 55-Gal	01-035-5392 01-422-9329 01-035-5393 01-422-9335 01-035-5394 01-422-9340	★ Final Drives ★ Heavy Duty Industrial type Enclosed Gear Units																																																																																																																			
	GO-85/140 (SAE 85W-140)	O-228	1-Qt 5-Gal 55-Gal	01-048-4591 01-035-5395 01-035-5396	★ Manual Transmission																																																																																																																			
	GO-80/90 (SAE 80W-90) LIMITED SLIP	O-226	5-Gal	00-001-9395 01-422-9342	★ Steering Gears ★ Wire Rope																																																																																																																			
					★ Fluid Lubricated Universal Joints																																																																																																																			
<p><u>Comments:</u> The temperature ranges recommended for usage of the various oils conform with requirements established by the Lube Orders (LO) for the majority of the combat and tactical ground systems. However, requirements for some equipment may vary from these recommendations and individual LO's must be consulted if there is a question as to the proper grade of lubricant which should be used. Limited-slip differentials allow unequal torque to be transmitted to each axle and require the use of special friction modified gear lubricants. For these applications those gear lubricants designated "GO-80/90 LIMITED SLIP" are required. The friction-modified oils can be used in standard (non limited-slip) differentials, without any adverse effect. The NSNs identified with a - ♦ - are for gear lubricants manufactured with a minimum of 25% re-refined basestock.</p>																																																																																																																								

SOLID FILM LUBRICANTS					UNCLASSIFIED	DESCRIPTION															
MIL-PRF-46010	- Lubricant, Solid Film, Heat Cured, Corrosion Inhibiting, NATO Code Number S-1738				MIL-PRF-46010 is dispersion of lubricating solids suspended in an adhesive binder that upon application and heat curing provides a solid lubricating surface. MIL-PRF-46147 is a dispersion of lubricating solids suspended in an adhesive binder that can be applied to a surface and allowed to dry at room temperature to form the solid lubricating surface. MIL-L-23398 is similar to MIL-PRF-46147 except it provides corrosion protection against exposure to sulfurous acid, but does not have the same wear properties.																
MIL-PRF-46147	- Lubricant, Solid Film, Air-Cured, Corrosion Inhibiting																				
MIL-L-23398	- Lubricant, Solid Film, Air-Cured, Corrosion Inhibiting, NATO Code Number S-749																				
Military Specification	Military Symbol	NATO Code	Size Container	NSN 9150-	Application (All Products)	Ambient Temperature Range Usage															
MIL-PRF-46010 Type III	NONE	S-1738	1-Gal	01-416-9506 (Natural)	★ Special Uses  Form 1-Color 2 Form 1-Color 2 Form 1-Color 1 Form 1-Color 1 Form 2-Color 2 Form 2-Color 2 Form 2-Color 1 Form 2 Color 1  01-500-2751 01-500-2795 01-500-2801 01-500-3017 01-500-3099 01-500-3104 01-500-3108 01-500-3114  01-260-2534 00-954-7422  (Aerosol)	EXPECTED TEMPERATURES															
MIL-PRF-46147 Type 1-Can	NONE		1-Gal	01-416-9509 (Black)																	
Type 1-Aerosol	NONE		1-Qt 1Gal 1-Qt 1-Gal 12 Oz. 16 Oz. 12 Oz. 16 Oz.	01-360-1908 01-360-1909 01-360-1907 00-142-9361 01-360-1904 01-360-1906 01-360-1903 01-360-1905																	
Type II	NONE			01-500-2751 01-500-2795 01-500-2801 01-500-3017 01-500-3099 01-500-3104 01-500-3108 01-500-3114																	
MIL-L-23398	NONE	S-749	16 Oz. 1 Qt.	01-260-2534 00-954-7422																	
Comments: MIL-PRF-46010 provides both high load carrying capacity and long wear life and also both types of corrosion protection. MIL-PRF-46010 is low in volatile organic compound content and lead free. SAE AS 5272 is an older version of MIL-PRF-46010 and continues to have Types I, II, and III for Aerospace use. MIL-PRF-46147 has two types. Type I, available in bulk and in aerosol cans, is solvent based. Type II, available in bulk form only, has a lower endurance life than Type I. The aerosol form provides in-field use capability. Both MIL-PRF-46010 and MIL-PRF-46147 are available in black and natural colors. MIL-L-23398 is similar to MIL-PRF-46147 except for performance differences noted in the Description section above.																					

WEAPON LUBRICANTS						UNCLASSIFIED	DESCRIPTION																																																																																																																																																																			
MIL-PRF-14107 - Lubricating Oil, Weapons, Low Temperature MIL-L-46000 * - Lubricant, Semi-Fluid (Automatic Weapons) MIL-L-46150 - Lubricant, Weapons, Semi-Fluid (High Load Carrying Capacity) MIL-PRF-63460 - Lubricant, Cleaner and Preservative for Weapons and Weapons Systems (Metric) MIL-PRF-85336 - Lubricant, All Weather (Automatic Weapons)						<b>MIL-PRF-14107</b> is a low temperature preservative and lubricating oil for aircraft and small caliber ground weapons. <b>MIL-L-46000*</b> is a semi-fluid lubricant for automatic weapons under conditions of extreme pressure for use in all temperatures. <b>MIL-L-46150</b> is a semi-fluid lubricant, containing "Teflon", for the 7.62 mm machine gun and for other applications requiring an extreme pressure (high load) lubricant with a low coefficient of friction. <b>MIL-PRF-63460</b> is a cleaner, lubricant and short term preservative for both small and large caliber weapons for use in a field environment where ease of application and convenience of a single product are important. It is usable in all climatic conditions. <b>MIL-PRF-85336</b> is a petroleum and/or synthetic corrosion inhibited semi-fluid intended for lubrication of aircraft weapons.																																																																																																																																																																				
Military Specification	Military Symbol	NATO Code	Size Container	NSN 9150-	Application (All Products)	Ambient Temperature Range Usage																																																																																																																																																																				
MIL-PRF-14107	LAW	O-157	1-Qt 5-Gal	00-292-9689 00-292-9687	* Small caliber Weapons	<table><tr><th colspan="16">EXPECTED TEMPERATURES</th></tr><tr><td>°F</td><td>&lt;-50</td><td>-40</td><td>-30</td><td>-20</td><td>-10</td><td>0</td><td>10</td><td>20</td><td>30</td><td>40</td><td>50</td><td>60</td><td>70</td><td>80</td><td>90</td><td>100</td><td>110</td><td>120</td></tr><tr><td>°C</td><td>&lt;-46</td><td>-40</td><td>-34</td><td>-29</td><td>-23</td><td>-18</td><td>-12</td><td>-7</td><td>-1</td><td>4</td><td>10</td><td>16</td><td>21</td><td>27</td><td>32</td><td>38</td><td>44</td><td>49</td></tr><tr><td colspan="19">LAW (O-157)</td></tr><tr><td colspan="19">LSA (O-158)</td></tr><tr><td colspan="19">LSAT</td></tr><tr><td colspan="19">CLP (S-758)</td></tr><tr><td colspan="19">MIL-PRF-85336</td></tr></table>																EXPECTED TEMPERATURES																°F	<-50	-40	-30	-20	-10	0	10	20	30	40	50	60	70	80	90	100	110	120	°C	<-46	-40	-34	-29	-23	-18	-12	-7	-1	4	10	16	21	27	32	38	44	49	LAW (O-157)																			LSA (O-158)																			LSAT																			CLP (S-758)																			MIL-PRF-85336																		
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MIL-L-46000	LSA	O-158	2-Oz 4-Oz 1-Qt 1-Gal	00-935-6597 00-889-3522 00-687-4241 00-753-4686	* Large caliber Weapons																																																																																																																																																																					
MIL-L-46150	LSAT-T	NONE	8-Oz 1-Lb	00-949-0323 01-109-7793	* Small caliber Weapons																																																																																																																																																																					
MIL-PRF-63460	CLP	S-758	1/2-Oz 4-Oz 1-Pt 1-Lt 1-Gal	01-102-1473 01-079-6124 01-054-6453 01-327-9631 01-053-6688	* Small and Large Automatic Weapons																																																																																																																																																																					
MIL-PRF-85336	NONE	NONE	1-Qt	01-104-5227	* See Comments																																																																																																																																																																					
<u>Comments:</u> MIL-PRF-63460 may be used instead of MIL-PRF-372 (Rifle Bore Cleaner), MIL-PRF-32033 (Low Temperature Preservative Lubricating Oil), and MIL-PRF-3150 (Medium Preservative Lubricating Oil). MIL-PRF-14107, MIL-L-46000 and MIL-L-46150 may be used for specific applications where tests have shown it to be satisfactory for large and small caliber weapons. MIL-PRF-85336 is intended for use on 20 mm rotary guns on almost all parts. It reduces corrosion in marine environments, permits high firing rates at low temperatures, and permits operation under icing conditions. * Specification is Inactive for New Design.																																																																																																																																																																										

TACTICAL HYDRAULIC FLUIDS						UNCLASSIFIED	DESCRIPTION																																																																																																																		
MIL-PRF-46170 - Hydraulic Fluid, Rust Inhibited, Fire Resistant, Synthetic Hydrocarbon Base						<b>MIL-PRF-46170</b> is a synthetic hydrocarbon base hydraulic fluid. Type I is undyed and is intended for tank recoil and hydraulic systems. <b>MIL-PRF-6083</b> is a petroleum based hydraulic fluid for use as a recoil and hydraulic fluid in howitzers and certain other equipment where MIL-PRF-46170 is not used. <b>MIL-H-53119</b> is a chlorotrifluoroethylene (CTFE) based hydraulic fluid which is nonflammable to all known flammability hazards. It is to be used only in hydraulic systems which are specifically designed for its use. All fluids meet stringent particle cleanliness standards. <b>MIL-PRF-6083</b> and <b>MIL-PRF-46170</b> are rust inhibited and are used both as preservatives for hydraulic systems and components as well as being operational fluids.																																																																																																																			
MIL-PRF-6083 - Hydraulic Fluid, Petroleum Base for Preservation and Operation																																																																																																																									
MIL-H-53119 - Hydraulic Fluid, Nonflammable, Chlorotrifluoroethylene Base																																																																																																																									
Military Specification	Military Symbol	NATO Code	Size Container	NSN 9150-	Application	Ambient Temperature Range Usage																																																																																																																			
MIL-PRF-46170 Type I (yellow)	FRH	H-544	1-Pt 1-Qt 1-Gal 5-Gal 55-Gal	01-332-7819 00-111-6256 00-111-6254 00-111-6255 01-158-0462	★ Hydraulic Systems	<table><tr><th colspan="19">EXPECTED TEMPERATURES</th></tr><tr><td>°F</td><td>&lt;-50</td><td>-40</td><td>-30</td><td>-20</td><td>-10</td><td>0</td><td>10</td><td>20</td><td>30</td><td>40</td><td>50</td><td>60</td><td>70</td><td>80</td><td>90</td><td>100</td><td>110</td><td>120</td></tr><tr><td>°C</td><td>&lt;-46</td><td>-40</td><td>-34</td><td>-29</td><td>-23</td><td>-18</td><td>-12</td><td>-7</td><td>-1</td><td>4</td><td>10</td><td>16</td><td>21</td><td>27</td><td>32</td><td>38</td><td>44</td><td>49</td></tr><tr><td colspan="19">OHT (C-635)</td></tr><tr><td colspan="19">FRH (H-544)</td></tr><tr><td colspan="19">NFH</td></tr></table>		EXPECTED TEMPERATURES																			°F	<-50	-40	-30	-20	-10	0	10	20	30	40	50	60	70	80	90	100	110	120	°C	<-46	-40	-34	-29	-23	-18	-12	-7	-1	4	10	16	21	27	32	38	44	49	OHT (C-635)																			FRH (H-544)																			NFH																		
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MIL-PRF-6083	OHT	C-635	Aerosol 1-Qt 1-Gal 5-Gal 55-Gal	00-159-4472 00-935-9807 00-935-9808 00-935-9809 00-935-9810	★ Gun Recoil Systems  ★ Tank Suspension Systems																																																																																																																				
MIL-H-53119*	NFH	NONE	none at this time	none at this time	★ ASM Vehicles																																																																																																																				
<u>Comments:</u> MIL-PRF-6083 and MIL-PRF-46170 may be used as emergency substitutes for each other. MIL-PRF-5606 (OHA, H-515) is the non-corrosion inhibited version of MIL-PRF-6083 and is not authorized for Army ground equipment. MIL-PRF-83282 (H-537) is the non-corrosion inhibited version of MIL-PRF-46170 and is not authorized for use in Army ground equipment. However, MIL-PRF-5606 and MIL-PRF-83282 may be used as emergency substitutes for MIL-PRF-6083 and MIL-PRF-46170. MIL-H-53119 is not compatible with either MIL-PRF-6083, MIL-PRF-46170, MIL-PRF-5606, MIL-PRF-83282, MIL-PRF-87257 and cannot be used as an emergency substitute for those fluids. <b>MIL-PRF-6083</b> has a flash point of at least 82°C, MIL-PRF-46170 has a flash point of at least 218°C, and <b>MIL-H-53119</b> has no flash point (is nonflammable). OE/HDO-15/40 and OE/HDO-10W (see page 6) are compatible with MIL-PRF-46170 and MIL-PRF-6083 may be able to be used in hydraulic systems. Please contact POLHelp prior to changing the hydraulic fluid in a vehicle system. * Inactive for New Design.																																																																																																																									

BIOBASED HYDRAULIC FLUID						UNCLASSIFIED	DESCRIPTION																																																						
MIL-PRF-32073 - Hydraulic Fluid, Biobased						MIL-PRF-32073 is a hydraulic fluid intended for use in hydraulic systems constructions equipment, bridging, tactical vehicles (when specified), shipboard systems, and metal working tools.																																																							
Military Specification	Military Symbol (Grade)	NATO Code	Size Container	NSN 9150-	Application	Ambient Temperature Range Usage																																																							
MIL-PRF-32073	Grade 1 (ISO VG 15)	NONE	1-Gal 5-Gal 55-Gal	01-498-0268 01-498-0315 01-498-0014		EXPECTED TEMPERATURES																																																							
						<table><tr><td>°F</td><td>&lt;-50</td><td>-40</td><td>-30</td><td>-20</td><td>-10</td><td>0</td><td>10</td><td>20</td><td>30</td><td>40</td><td>50</td><td>60</td><td>70</td><td>80</td><td>90</td><td>100</td><td>110</td><td>120</td></tr><tr><td>°C</td><td>&lt;-46</td><td>-40</td><td>-34</td><td>-29</td><td>-23</td><td>-18</td><td>-12</td><td>-7</td><td>-1</td><td>4</td><td>10</td><td>16</td><td>21</td><td>27</td><td>32</td><td>38</td><td>44</td><td>49</td></tr></table>																		°F	<-50	-40	-30	-20	-10	0	10	20	30	40	50	60	70	80	90	100	110	120	°C	<-46	-40	-34	-29	-23	-18	-12	-7	-1	4	10	16	21	27	32	38	44	49
°F	<-50	-40	-30	-20		-10	0	10	20	30	40	50	60	70	80	90	100	110	120																																										
°C	<-46	-40	-34	-29		-23	-18	-12	-7	-1	4	10	16	21	27	32	38	44	49																																										
	Grade 2 (ISO VG 22)	NONE	1-Gal 5-Gal 55-Gal	01-498-1483 01-498-1468 01-498-1481		Grade 1																																																							
	Grade 3 (ISO VG 32)	NONE	1-Gal 5-Gal 55-Gal	01-503-1775 01-503-1759 Not Avail yet		Grade 2																																																							
	Grade 4 (ISO VG 46)	NONE	1-Gal 5-Gal 55-Gal	01-498-1518 01-498-1492 01-498-1487		Grade 3																																																							
	Grade 5 (ISO VG 68)	NONE	1-Gal 5-Gal 55-Gal	01-498-1522 01-498-1523 01-498-1524		Grade 4																																																							
						Grade 5																																																							
Comments: MIL-PRF-32073 covers five viscosity grades. Selection of viscosity grades should be based on the low temperature operational requirement. These hydraulic fluids are intended for use in environmentally sensitive areas such as construction, forestry, river and mining. If used in any other equipment of hydraulic systems, a study should be made to determine its applicability for the systems.																																																													

MACHINE TOOL HYDRAULIC FLUID						UNCLASSIFIED	DESCRIPTION													
A-A-59354 Hydraulic Fluid, Petroleum Base, For Machine Tools						A-A-59354 hydraulic fluid intended for use in hydraulic systems of metal-working tools which require anti-wear oils.														
Military Specification	Military Symbol (Grade)	NATO Code	Size Container	NSN 9150-	Application	Ambient Temperature Range Usage														
A-A-59354	Grade 1 (ISO VG 32)	NONE	5-Gal 55-Gal	00-966-8830 00-966-8831		EXPECTED TEMPERATURES														
						°F	<-50	-40	-30	-20	-10	0	10	20	30	40	50	60	70	80
	°C	< -46	-40	-34		-29	-23	-18	-12	-7	-1	4	10	16	21	27	32	38	44	49
	Grade 1																			
	Grade 2																			
	Grade 3																			
	Grade 4																			
	Comments: A-A-59354 covers four viscosity grades. Selection of viscosity grades should be based on the recommendation of the machine tool manufacturer. These hydraulic fluids may also be used in application requiring corrosion-inhibiting and oxidation-resistant lubricating oils.																			



AUTOMATIC TRANSMISSION FLUID						UNCLASSIFIED	DESCRIPTION																	
GM 6297-M , Automatic Transmission Fluid						GM 6297-M is intended for use in automatic transmissions in GM and AMC manufactured administrative and some tactical vehicles. The transmission of these vehicles requires fluids with special frictional characteristics.																		
Specification	Military Symbol	NATO Code	Size Container	NSN	Application (All Products)	Ambient Temperature Range Usage																		
GM 6297-M	NONE	NONE	1 Qt 5 Gal 1 Qt HDPE 55 Gal	91 50-00-698-2382 91 50-00-657-4959 91 50-01-353-4799 91 50-01-114-9968	Automatic Transmissions	FOR GM AND AMC AUTOMATIC TRANSMISSIONS																		
						EXPECTED TEMPERATURES																		
						°F	<-50	-40	-30	-20	-10	0	10	20	30	40	50	60	70	80	90	100	110	120
						°C	<-46	-40	-34	-29	-23	-18	-12	-7	-1	4	10	16	21	27	32	38	44	49
						(GM 6297-M)																		

BRAKE FLUID						UNCLASSIFIED	DESCRIPTION																	
MIL-PRF-46176 - Brake Fluid, Silicone, Automotive, All Weather, Operational and Preservative, Metric						<b>MIL-PRF-46176</b> is a silicone brake fluid classified as DOT 5 which is resistant to water and prevents corrosion. It also meets SAE J1705 (Low Water Tolerant Brake Fluids).																		
Military Specification	Military Symbol	NATO Code	Size Container	NSN	Application	Ambient Temperature Range Usage																		
MIL-PRF-46176	BFS	H-547	1-Gal 5-Gal 55-Gal	01-102-9455 01-123-3152 01-072-8379	★ Brake Systems	EXPECTED TEMPERATURES																		
						°F	<-50	-40	-30	-20	-10	0	10	20	30	40	50	60	70	80	90	100	110	120
						°C	<-46	-40	-34	-29	-23	-18	-12	-7	-1	4	10	16	21	27	32	38	44	49
						BFS (H-547)																		
<u>Comments:</u> MIL-PRF-46176 is a corrosion inhibiting brake fluid that has a higher vapor lock temperature than conventional SAE 1703 or DOT 3 brake fluids (i.e., glycol ether base brake fluid). It can be used in arctic environments and also functions as a preservative fluid in storage/prepositioning applications.																								
MIL-PRF-46176 is not compatible with conventional DOT 3 and DOT 4 brake fluids. DOT 5 is a silicone brake fluid similar to MIL-PRF-46176, but has slightly different viscosity properties.																								

TACTICAL GREASES	
UNCLASSIFIED	DESCRIPTION

**MIL-PRF-10924** covers one grade of a multi-purpose biodegradable grease for lubrication and surface corrosion protection of all ground vehicles and equipment. **MIL-PRF-81322** covers a general purpose grease for use in aircraft accessories. These greases are not intended for use on machinery which comes in contact with food.

Military Specification		Military Symbol	NATO Code	Size Container	NSN 9150-	Application	Ambient Temperature Range Usage																																																																																																																	
MIL-PRF-10924		GAA	G-403	2- 1/4 oz 14-oz 1.75- lb 6.5- lb 35- lb 120- lb 370- Lb	01-197-7688 01-197-7693 01-197-7690 01-197-7689 01-197-7692 01-197-7691 01-501-7745	<p>★ Automotive Wheel Bearing and Chassis System</p> <p>★ Artillery</p> <p>★ Ground Equipment</p> <p>★ General Application</p>	<table><tr><th colspan="19">EXPECTED TEMPERATURES</th></tr><tr><th>°F</th><th>&lt;-50</th><th>-40</th><th>-30</th><th>-20</th><th>-10</th><th>0</th><th>10</th><th>20</th><th>30</th><th>40</th><th>50</th><th>60</th><th>70</th><th>80</th><th>90</th><th>100</th><th>110</th><th>120</th></tr><tr><th>°C</th><th>&lt; -46</th><th>-40</th><th>-34</th><th>-29</th><th>-23</th><th>-18</th><th>-12</th><th>-7</th><th>-1</th><th>4</th><th>10</th><th>16</th><th>21</th><th>27</th><th>32</th><th>38</th><th>44</th><th>49</th></tr><tr><td colspan="19">GAA (G-403)</td></tr><tr><td colspan="19">WTR (G-395)</td></tr></table>																			EXPECTED TEMPERATURES																			°F	<-50	-40	-30	-20	-10	0	10	20	30	40	50	60	70	80	90	100	110	120	°C	< -46	-40	-34	-29	-23	-18	-12	-7	-1	4	10	16	21	27	32	38	44	49	GAA (G-403)																			WTR (G-395)																		
EXPECTED TEMPERATURES																																																																																																																								
°F	<-50	-40	-30	-20	-10	0	10	20	30	40	50	60	70	80	90	100	110	120																																																																																																						
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GAA (G-403)																																																																																																																								
WTR (G-395)																																																																																																																								
MIL-PRF-81322		WTR	G-395	8-oz 1- lb 5- lb 35- lb	00-181-7724 00-944-8953 00-145-0268 00-935-5851	<p>★ Aircraft Wheel Bearings</p> <p>★ Anti-friction Bearings</p> <p>★ Gear Box</p> <p>★ Plain Bearings</p>																																																																																																																		

Comments: MIL-PRF-10924 is lithium complex grease and bio-degradable grease. It is designed for use over a wide operating temperature and in a saltwater corrosion environment. Most of MIL-PRF-81322 greases are clay-thickened greases and they may not be fully compatible with MIL-PRF-10924 greases. Both greases can be used where bearing temperatures range from -54°C to 180°C.

GENERAL GREASES						UNCLASSIFIED	DESCRIPTION																																																																																																						
VV-G-632 - Grease, Industrial, General Purpose VV-G-671 - Grease, Graphite						VV-G-632 and VV-G-671 each cover one grade of a lubricating grease intended primarily for the lubrication of machinery which is equipped with compression type grease cups. VV-G-671 covers graphite grease and provides a higher load-carrying capacity than VV-G-632 grease.																																																																																																							
Military Specification	Military Symbol	NATO Code	Size Container	NSN	Application	Ambient Temperature Range Usage																																																																																																							
VV-G-632	NONE	NONE	8-oz 35-lb	00-753-4649 00-273-2374	★ General Equipment and Machinery	<table><tr><th colspan="18">EXPECTED TEMPERATURES</th></tr><tr><td>°F</td><td>&lt;-50</td><td>-40</td><td>-30</td><td>-20</td><td>-10</td><td>0</td><td>10</td><td>20</td><td>30</td><td>40</td><td>50</td><td>60</td><td>70</td><td>80</td><td>90</td><td>100</td><td>110</td><td>120</td></tr><tr><td>°C</td><td>&lt;-46</td><td>-40</td><td>-34</td><td>-29</td><td>-23</td><td>-18</td><td>-12</td><td>-7</td><td>-1</td><td>4</td><td>10</td><td>16</td><td>21</td><td>27</td><td>32</td><td>38</td><td>44</td><td>49</td></tr><tr><td colspan="18">VV-G-632 (NONE)</td></tr><tr><td colspan="18">VV-G-671 (G-412)</td></tr></table>												EXPECTED TEMPERATURES																		°F	<-50	-40	-30	-20	-10	0	10	20	30	40	50	60	70	80	90	100	110	120	°C	<-46	-40	-34	-29	-23	-18	-12	-7	-1	4	10	16	21	27	32	38	44	49	VV-G-632 (NONE)																		VV-G-671 (G-412)																	
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VV-G-632 (NONE)																																																																																																													
VV-G-671 (G-412)																																																																																																													
VV-G-671	GG2	G-412	1.75-lb 6.5-lb	00-190-0918 00-190-0919	★ General Equipment and Machinery requiring a Graphite Grease																																																																																																								
Comments: Neither of these greases are inhibited against oxidation or corrosion under adverse conditions. Caution is advised in using these greases in non-specified applications. Particularly, the use of graphite grease in non-specified applications should be done only after evaluating its compatibility with all involved materials. Consult Lube Order (LO) for specific guidance. VV-G-671 contains 4.5 to 5.5% graphite.																																																																																																													

ANTIFREEZE AND TEST KIT						UNCLASSIFIED	DESCRIPTION																																																																																																										
A-A-52624 Antifreeze, Multi Engine Type						<b>A-A-52624</b> covers a fully formulated commercial antifreeze for use in tactical/combat liquid-cooled internal Combustion engines other than aircraft. It covers two types and each type can have up to three concentrations as follows: Type I: Ethylene Glycol Based; Type II: Propylene Glycol Based. Concentration A: 100% Glycol by volume; Concentration B: 60% Glycol by volume; Concentration C: 50% Glycol by volume. The concentrated versions (Type I A or Type II A) must be blended prior to using in radiator. <b>A-A-51461 Type II</b> covers a test strip kit for determining both the freeze point and nitrite concentration of antifreeze.																																																																																																											
A-A-51461 Test Kit, Test Strips and Color Chart, Antifreeze, Freeze Point and Nitrite Concentration																																																																																																																	
Type I																																																																																																																	
Type II																																																																																																																	
Military Specification	Military Symbol	NATO Code	Size Container	NSN 6850-	Application	Ambient Temperature Range Usage																																																																																																											
A-A-52624 (Virgin) Type I A	NONE	S-750	1-Gal 5-Gal CO 1-QT	01-464-9125 01-441-3221 00-664-1399	Multi Engines	<div>EXPECTED TEMPERATURES</div> <table><tr><td>°F</td><td>&lt;-50</td><td>-40</td><td>-30</td><td>-20</td><td>-10</td><td>0</td><td>10</td><td>20</td><td>30</td><td>40</td><td>50</td><td>60</td><td>70</td><td>80</td><td>90</td><td>100</td><td>110</td><td>120</td></tr><tr><td>°C</td><td>&lt;-46</td><td>-40</td><td>-34</td><td>-29</td><td>-23</td><td>-18</td><td>-12</td><td>-7</td><td>-1</td><td>4</td><td>10</td><td>16</td><td>21</td><td>27</td><td>32</td><td>38</td><td>44</td><td>49</td></tr><tr><td colspan="19">60/40 A-A-52624 (Type I &amp; II-B)</td></tr><tr><td colspan="19">A-A-52624 Type (I &amp; II - C)</td></tr><tr><td colspan="19">A-A-51461</td></tr></table> * A mixture of 60% A-A-52642 Types I and II and 40% water will provide freeze protection down to approximately -56°F (-49°C).													°F	<-50	-40	-30	-20	-10	0	10	20	30	40	50	60	70	80	90	100	110	120	°C	<-46	-40	-34	-29	-23	-18	-12	-7	-1	4	10	16	21	27	32	38	44	49	60/40 A-A-52624 (Type I & II-B)																			A-A-52624 Type (I & II - C)																			A-A-51461																		
°F	<-50	-40	-30	-20	-10														0	10	20	30	40	50	60	70	80	90	100	110	120																																																																																		
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A-A-51461																																																																																																																	
(Virgin) Type IIA			55 Gal DR Box/6, 1Gal	01-383-3918 01-383-4244	Multi Engines																																																																																																												
(Virgin) Type IB			1 Gal 5 Gal CO 55 Gal DR	01-441-3234 01-441-3240 01-441-3248	Arctic condition																																																																																																												
(Recycled) Type I	NONE	NONE	1-Gal 5-Gal CO 55 Gal DR	01-464-9125 01-464-9137 01-464-9152	Multi Engines																																																																																																												
A-A-52624 Recycled Type IB	NONE		1-Gal 5-Gal CO 55-Gal DR	01-464-9266 01-464-9263 01-464-9096	Arctic condition																																																																																																												
Recycled Type IIA	NONE		1Gal 5-Gal 55-Gal	01-383-4068 01-441-3257 01-383-3918	Multi Engines																																																																																																												
Recycled Type IC	NONE		1-Gal 5-Gal CO 55-Gal DR	01-471-6530 01-471-6534 01-471-6521	Multi Engines																																																																																																												
A-A-51461	NONE	NONE	Kit	Type II (See comment)	A-A-52624 coolants																																																																																																												
Comments: Use commercial test strips that test for freeze point and nitrite concentration for both ethylene glycol and propylene glycol based coolants.																																																																																																																	

FUEL ANTI-ICING ADDITIVE						UNCLASSIFIED	DESCRIPTION																	
MIL-DTL-85470, Inhibitor, Icing, Fuel System, High Flash						This product is used primarily used in turbine fuels to cope with small amounts of water contamination (entrained water), or to keep separated water from freezing. Military turbine fuels (JP-4, JP-5 and JP-8) are procured with the Fuels System Icing Inhibitor (FSII) already in the fuel. Additional FSII is not added to these fuels except under special circumstances (e.g., removal of the original FSII by water contact). FSII can also be added to commercial turbine fuels (ASTM D 1655) which do not already contain it in order for these fuels to be brought up to military standards if so authorized. FSII can also be used in diesel fuels (A-A-52557, ASTM D 975) to meet low temperature needs. FSII has no effect on the diesel fuel cloud point (wax formation tendency).																		
Military Specification	Military Symbol	NATO Code	Size Container	NSN	Application (All Products)	Ambient Temperature Range Usage																		
MIL-DTL-85470	FSII	S-1745	5 Gal 55 Gal	6850-01-057-6427 6850-01-089-5514	√ Bulk and Intermediate Fuel Tanks  √ Fuel Transport Vehicles and Fuel Cells	FOR FUEL STORAGE AND VEHICLE FUEL SYSTEMS																		
						EXPECTED TEMPERATURES																		
						°F	<-50	-40	-30	-20	-10	0	10	20	30	40	50	60	70	80	90	100	110	120
						°C	< -46	-40	-34	-29	-23	-18	-12	-7	-1	4	10	16	21	27	32	38	44	49
						FSII (S-1745)																		
<div>Addition instructions: FSII should only be added to turbine fuels by direction of the Petroleum Officer. To determine the level of FSII in turbine fuels, use ASTM D 5006.. Prescribed levels of FSII for turbine fuels are as follows: JP-4, 0.10 to 0.15 vol % ; JP-5, 0.15 to 0.20 vol % ; JP-8, 0.10 to 0.15 vol %. Addition of FSII to turbine fuels can be accomplished through the use of special injection equipment available at selected Air Force bases; otherwise use batch addition and mixing. Recommended level of FSII to diesel fuel (A-A-52557, ASTM D 975) is 0.15 vol %. Addition can be accomplished batch-wise by adding FSII on top of the fuel in a storage tank or tank truck; mixing can be accomplished by recirculating the fuel for at least 5 minutes for each 1000 gallons at a rate of at least 50 gallons per minute.</div>																								
<div>Diethylene glycol monomethyl ether (DIEGME) is hazardous to health. Before handling DIEGME, proper safety precautions should be followed. Avoid contact with skin and eyes by wearing protective gloves and goggles. Read the instructions on the container and the Materials Safety Data Sheet (MSDS) before handling the additive. Use the recommended protective equipment. In case of leaks or spills, follow the instructions in the MSDS for disposal.</div>																								

FUEL BIOCIDES/STABILIZER ADDITIVE						UNCLASSIFIED	DESCRIPTION																	
MIL-S-53021 - Stabilizer Additive, Diesel Fuel							MIL-S-53021 is for use in diesel fuel (A-A-52557, ASTM D 975) intended for intermediate (6-24 months) or long term (25-60 months) storage. This additive is designed to retard or prevent the formation of fuel deterioration products (i.e., gums, sludge, particulates, etc.) resulting from auto-oxidation, to reduce the potential for microbiological growth, and to provide for corrosion protection of fuel-wetted surfaces. This additive is for the treatment of fuel in (1) depot facilities where vehicles/equipment are in re-build or storage, (2) pre-positioned materiel at locations involving storage of equipment partially or fully fueled, and (3) fuel stocks intended for intermediate or long-term storage. Fuels treated with this additive shall not be used in aircraft.																	
Military Specification	Military Symbol	NATO Code	Size Container	NSN	Application	Ambient Temperature Range Usage																		
MIL-S-53021						FOR FUEL STORAGE AND VEHICLE FUEL SYSTEMS																		
Type I	NONE	NONE	5 Gal 55 Gal	6850-01-246-6544 6850-01-246-6545	★ Bulk and Intermediate Fuel Storage Tanks	EXPECTED TEMPERATURES																		
Type II: Biocide Stabilizer	NONE	NONE	5 Gal (Use both NSNs)	6840-01-173-6940 6850-01-167-4789	★ Fuel Transport Vehicles and Fuel Cells	°F	<-50	-40	-30	-20	-10	0	10	20	30	40	50	60	70	80	90	100	110	120
Biocide Stabilizer			55 Gal (Use both NSNs)	6840-01-041-0098 6850-01-167-4788		°C	<-46	-40	-34	-29	-23	-18	-12	-7	-1	4	10	16	21	27	32	38	44	49
						MIL-S-53021																		
Comments: There are two types of stabilizer additives that have been qualified: the one package (Type I) and two package (Type II) systems. In the two-package type (i.e., Type II), the biocide is in one package or container, and the remaining additives are in the other. In most cases, both packages in Type II must be ordered and used together for maximum effectiveness. The one-package type (i.e., Type I) stabilizer additive has all of the additives, including the biocide, blended together in one container. The additives are supplied under several different brand names as listed in QPL-53021. The recommended treat rate varies with brand name and is specified in the QPL.																								
Mixing tips: When possible, bulk fuel supplies should be treated prior to dispensing the fuel, rather than treating fuel in individual vehicle fuel tanks. Additive(s) should not be added to an empty fuel tank and should be kept away from water. Most effective addition of the additive is to add to a partially filled tank as the additional fuel subsequently being introduced will provide agitation. Addition in a flowing stream is also effective. After fuel in a vehicle is treated, fuel filters may need to be changed due to the accumulation of dead microbiological debris.																								
Observe proper safety precautions when handling additives. Handle the product in open areas with good ventilation and avoid excessive inhalation of vapors. During hot weather, which increases the vapor hazard, or if handling the additives in enclosed areas, use hydrocarbon vapor-absorbing respiratory protection. Avoid contact with skin and eyes by wearing protective gloves and goggles. Read the instructions on the container and the Materials Safety Data Sheet (MSDS) before handling the additives. Use the recommended protective equipment. In case of leaks or spills, follow the instructions in the MSDS for disposal.																								

GROUND FUEL LUBRICITY ENHANCEMENT USING CORROSION INHIBITOR/LUBRICITY IMPROVER					UNCLASSIFIED	DESCRIPTION
MIL-PRF-25017 - Inhibitor, Corrosion/Lubricity Improver, Fuel Soluble (Metric)						The <b>MIL-PRF-25017</b> Corrosion Inhibitor/Lubricity Improver (CI/LI) is primarily an aircraft fuel additive mandated for use in all military aircraft turbine fuels (JP-4, JP-5, JP-8). It is supplied under several different brand names as listed in QPL-25017. The recommended dosage varies with brand name. It usually is not added at depot or by using units but is supplied in the fuel by refiners. The additive can be added to ground fuels to enhance lubricity. The QPL places brands in two categories: category 1 for ground and aircraft fuels and category 2 for aircraft fuels only. It has been determined that at the recommended dosage it is an effective fuel lubricity enhancer.
Military Specification	Military Symbol	NATO Code	Size Container	NSN	Application	Ambient Temperature Range Usage
MIL-PRF-25017	NONE	S-1747	1 Gal 55 Gal	01-180-1074 00-292-9780	★ Bulk and Intermediate Fuel Storage Tanks  ★ Fuel Transport Vehicles	FOR FUEL STORAGE AND VEHICLE FUEL SYSTEMS
EXPECTED TEMPERATURES						
°F						<-50 -40 -30 -20 -10 0 10 20 30 40 50 60 70 80 90 100 110 120
°C						< -46 -40 -34 -29 -23 -18 -12 -7 -1 4 10 16 21 27 32 38 44 49
						MIL-PRF-25017
Additional instructions: It is recommended that addition of additives be accomplished at the wholesale level. Addition to ground fuels is best accomplished with fuel injectors that can control dosage. Second best option is to add in tank vehicles or in above ground tanks. Premix the additive with a small quantity of fuel (about 0.5 % of the quantity of fuel to be treated) and add to the tank <i>before</i> the bulk fuel. Mixing is accomplished by recirculation within the tank. Mixing time can be estimated by using the following formula: mixing time (min.) = 1/2(fuel quantity)/(recirculating pump capacity). If premix must be poured over the top of the fuel, mixing time should be doubled. If recirculation is not possible, mixing may be achieved by movement of the tank. Tank vehicle should be driven at moderate speed over rough terrain for a minimum of fifteen minutes or on a highway for 30 minutes.						
<b><i>In general, the MIL-PRF-25017 additive is considered mildly hazardous. The hazard varies with the formulation used, check with the Material Safety Data Sheet (MSDS) supplied with the additive. Avoid contact with skin and eyes by wearing protective gloves and goggles. In case of leaks or spills, follow the instructions in the MSDS for disposal. When recirculating fuel within a tank, be sure to ground the discharge nozzle to the tank body.</i></b>						





DIESEL AND TURBINE FUELS						UNCLASSIFIED	DESCRIPTION																	
<div>ASTM D 975</div> <div>MIL-DTL-5624</div> <div>MIL-DTL-83133*</div> <div>ASTM D 1655</div> <div>- Standard Specification for Diesel Fuel Oils</div> <div>- Turbine Fuel, Aviation, Grades JP-4, JP-5</div> <div>- Turbine Fuel, Aviation, Kerosene Type, NATO F-34 (JP-8)</div> <div>- NATO F-35, and JP-8+100</div> <div>- Standard Specification for Aviation Turbine Fuels</div>								AR 70-12 provides the policies and responsibilities for use of liquid hydrocarbon fuels and identifies the primary, alternate, and emergency fuels for use in Army materiel. Diesel and turbine fuels are identified in AR 70-12 and are intended for use in ground combat, tactical and administrative vehicles and equipment as indicated in vehicle/equipment manuals. ASTM D 975 covers commercial diesel fuels designated Grade No. 1-D (S15, S500 and S5000), Grade No. 2-D (S15, S500 and S5000) and Grade No. 4-D. It is recommended that the low sulfur (S15) fuels be used. Off-road, non-taxed, fuels will contain a red dye. DF-2,(F-54), is high-sulfur fuel for use outside the U.S., territories and possessions. MIL DTL-83133 (JP 8), MIL DTL 5624 (JP-5), and ASTM D 1655 (JET A-1) cover kerosene base turbine fuels suitable for use in all compression-ignition (diesel) and turbine engines, for OCONUS and CONUS use.																
Specification	Military Symbol	NATO Code	Size Container	NSN	Application	Temperature Range Usage																		
ASTM D 975	LS-1 LS-2	--- ---	Bulk Bulk	9140- 01-398-1130 01-398-0697	★ Ground Diesel and Turbine Engines	FOR ENGINES AND OTHER FUEL CONSUMING EQUIPMENT																		
MIL-DTL-5624	JP-5	F-44	Bulk	9130- 00-273-2379	★ Turbine and Diesel Engines	EXPECTED TEMPERATURES																		
						°F	<-50	-40	-30	-20	-10	0	10	20	30	40	50	60	70	80	90	100	110	120
						°C	<-46	-40	-34	-29	-23	-18	-12	-7	-1	4	10	16	21	27	32	38	44	49
						DL-1 (Winter grade diesel fuel)																		
						DL-2, DF-2 (Regular grade diesel fuel)																		
						JP-5, JP-8, JET A-1 (Turbine fuel, kerosene type)																		
ASTM D 1655																								
^ See comments																								
Comments: <b>MIL-DTL-83133</b> (JP-8) will be used as the primary fuel in all theaters in accordance with the Single Fuel on the Battlefield policy following DOD Directive 4140.25 and AR 70-12. JET A-1, even though equivalent to JP-8, does not contain the additives required under JP-8. The additives required in JP-8 enhance the lubricity properties of the fuel preventing fuel pump wear in rotary-type fuel distribution injection pumps. However, this is not true for Jet A-1 and its use could result in fuel pump wear problems unless the equipment has been retrofitted with arctic equipment. <b>For this reason, JET A-1 is not recommended for use in ground diesel engine equipment unless the fuel is additized to meet the recommended concentration of the corrosion inhibitor/lubricity improver (CI/LI) additive in accordance with QPL-25017.</b>																								
*JP-8+100 is not approved for use in Army systems.																								



MIL-PRF-680, DEGREASING SOLVENTS					UNCLASSIFIED	DESCRIPTION																																																																																																																																																		
MIL-PRF-680 - Degreasing Solvent					<b>MIL-PRF-680</b> is a petroleum distillate degreasing solvent used for degreasing of machine parts in equipment maintenance. It is also known as "mineral spirits" or as "petroleum spirits." There are four types. <b>Type I</b> is an odorless Stoddard Solvent. It is intended to be used as a relatively safe dry cleaning solvent. When used indoors, adequate ventilation must be available to avoid excessive accumulation of vapors. <b>Type II</b> is an odorless high flash point (140°F) solvent. It should be used where a higher flash point solvent is required. When used indoors, adequate ventilation must be available to avoid excessive accumulation of vapors. <b>Type III</b> is an odorless 200°F flash point solvent. It is intended for used where a very high flash point is required and where conditions require that an odorless product is needed. It has a slower evaporation rate than Types I and II, and IV. <b>Type IV</b> is a citrus based hydrocarbon solvent. The performance of this solvent is very similar to Type II solvent. <b>Type V</b> is a low VOC solvent. The performance of this solvent is very similar to Type II solvent.																																																																																																																																																			
Military Specification	Military Symbol	NATO Code	Size Container	NSN 6850-	Application	Ambient Temperature Range Usage																																																																																																																																																		
MIL-PRF-680 Type I	SD-1	S-752	1 Gallon 5 Gallon 55 Gallon	01-474-2302 01-474-2309 01-474-2313	★ Degreasing & for metal parts where flammability is not an issue.	<table><tr><th colspan="18">EXPECTED TEMPERATURES</th></tr><tr><td>°F</td><td>&lt;-50</td><td>-40</td><td>-30</td><td>-20</td><td>-10</td><td>0</td><td>10</td><td>20</td><td>30</td><td>40</td><td>50</td><td>60</td><td>70</td><td>80</td><td>90</td><td>100</td><td>110</td><td>120</td></tr><tr><td>°C</td><td>&lt;-46</td><td>-40</td><td>-34</td><td>-29</td><td>-23</td><td>-18</td><td>-12</td><td>-7</td><td>-1</td><td>4</td><td>10</td><td>16</td><td>21</td><td>27</td><td>32</td><td>38</td><td>44</td><td>49</td></tr><tr><td colspan="18">SD-1 (S-752)</td></tr><tr><td colspan="18">SD-2 (S-753)</td></tr><tr><td colspan="18">SD-3 (S-760)</td></tr><tr><td colspan="18">SD-4</td></tr><tr><td colspan="18">SD-5</td></tr></table>	EXPECTED TEMPERATURES																		°F	<-50	-40	-30	-20	-10	0	10	20	30	40	50	60	70	80	90	100	110	120	°C	<-46	-40	-34	-29	-23	-18	-12	-7	-1	4	10	16	21	27	32	38	44	49	SD-1 (S-752)																		SD-2 (S-753)																		SD-3 (S-760)																		SD-4																		SD-5																	
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MIL-PRF-680 Type II	SD-2	S-753	1 Gallon 5 Gallon 55 Gallon	01-474-2319 01-474-2317 01-474-2316	★ General degreasing for metal parts.																																																																																																																																																			
MIL-PRF-680 Type III	SD-3	S-760	1 Gallon 55 Gallon	01-474-2318 01-474-2320 01-474-2321	★ Degreasing for metal parts in confined areas or where high flash point is required.																																																																																																																																																			
MIL-PRF-680 Type IV	SD-4		Pint 1 Gal 5 Gal 55 Gal DR	01-472-2723 01-472-2722 01-472-2717 01-472-2719	★ General degreasing solvent for metal parts.																																																																																																																																																			
MIL-PRF-680 Type V	SD-5		1 Gal 5 Gal %% Gal	01-584-7237 01-584-7241 01-584-7227	★ Low VOC solvent and general degreasing for metal parts																																																																																																																																																			
<u>Comments:</u> MIL-PRF-680 is an environmentally compliant solvent and low toxic solvent. Typically, Type V is EPA VOC exempt solvent. However Type I is a flammable solvent due to its low flash point. All should be disposed of as a regulated hazardous waste or can be recycled.																																																																																																																																																								

CLEANING COMPOUND						UNCLASSIFIED	DESCRIPTION																	
MIL-PRF-372 - Cleaning Compound, Solvent (For BORE of Small Arms and Automatic Aircraft Weapons)						MIL-PRF-372 is a highly penetrating, mobile liquid intended for use in cleaning the bores of small arms and automatic aircraft weapons. The material provides a temporary rust-resistant coating for the cleaned surface.																		
Military Specification	Military Symbol	NATO Code	Size Container	NSN	Application	Ambient Temperature Range Usage																		
MIL-PRF-372	RBC	--	2-Oz. 8-Oz. 1-Quart 1-Gal	00-224-6656 00-224-6657 00-224-6658 00-224-6663	★ Cleaning compound and temporary preservative																			
						EXPECTED TEMPERATURES																		
						°F	<-50	-40	-30	-20	-10	0	10	20	30	40	50	60	70	80	90	100	110	120
						°C	<-46	-40	-34	-29	-23	-18	-12	-7	-1	4	10	16	21	27	32	38	44	49
						RBC																		

LUBRICATING OIL						UNCLASSIFIED	DESCRIPTION																			
MIL-DTL-53131 – Lubricating Oil, Precision Rolling Element Bearing, Polyalphaolefin Based						MIL-DTL-53131 lubricating oils are intended for use in the precision bearings of inertial guidance gyros, accelerometers and other suitable instrument bearing applications.																				
Military Specification	Military Symbol (Grade)	NATO Code	Size Container	NSN 9150-	Application	Ambient Temperature Range Usage																				
MIL-DTL-53131	Grade 4	NONE	1-Gal 5-Gal 55-Gal	01-498-0268 01-498-0315 01-498-0014	Precision Bearing Application	EXPECTED TEMPERATURES																				
	Grade 6	NONE	1-Gal 5-Gal 55-Gal	01-498-1483 01-498-1468 01-498-1481		°F	<-50	-40	-30	-20	-10	0	-18	-12	-7	20	30	40	50	60	70	80	90	100	110	120
						°C	< -46	-40	-34	-29	-23	-18	-12	-7	4	10	16	21	27	32	38	44	49			
	Grade 9	NONE	1-Gal 5-Gal 55-Gal	In process		Grade 4																				
						Grade 6																				
						Grade 9																				
	Grade 14	NONE	1-Gal 5-Gal 55-Gal			Grade 14																				
						Grade 40																				
Grade 40	NONE	1-Gal 5-Gal 55-Gal																								
Comments: MIL-DTL-53131 covers five different grades of synthetic oils according to their viscosity properties. This specification allows the users the option of using specified oils with the optimum viscosity and operating temperatures for the applications.																										

Comments: MIL-DTL-53131 covers five different grades of synthetic oils according to their viscosity properties. This specification allows the users the option of using specified oils with the optimum viscosity and operating temperatures for the applications.